November 12, 1946

Dr. H. E. Robinson, Assistant Director
of Research
Swift and Company
Union Stock Yards
Chicago 9, Illinois

Dear Dr. Robinson:

I thank you for your letter of November 6, 1946 calling my attention to the program for the support of fundamental research which is being carried on by Swift and Company, and describing your interest in the basic problems of protein structure.

Some years before the war we began at the California Institute of Technology a series of investigations into the crystal structures of the amino acids and simple peptides, investigations which I consider to be of primary importance in arriving at an understanding of the architecture of the protein molecule. The techniques of the investigation of the structure of crystals by x-ray diffraction have now been so highly developed that it is possible to determine in complete detail the structure of amino acids, peptides, prosthetic groups of proteins, such as the heme group, and other relatively simple substances related to proteins. Accurate and reliable structure determinations have been made so far only for two amino acids, glycine and alanine, and for two peptides, diketopiperazine and glycylglycine. All of these determinations were made in our laboratories. The data obtained from these determinations already provide a body of facts upon which to base conjectures regarding the arrangement of carbon, nitrogen, and oxygen atoms along the polypeptide chains of proteins; they also provide experimental evidence regarding the intermolecular interactions which are to be anticipated between adjacent protein molecules and the consequent probable steric configurations which are to be expected in solid proteins.

Our knowledge of proteins would be increased very greatly by similar detailed information for all of the naturally occurring amino acids and for a number of peptides and prosthetic groups of proteins. This is a research which clearly needs to be done, in order to provide a sound basis for attacking the great problem of the detailed structure of the proteins. It is possible for this information to be obtained, but it will be a big job, requiring probably ten years or more for its completion.

Now that the war is over and our scientific staff has returned to peace-time problems, I am very desirous that this work be carried forward at the California Institute of Technology with great vigor. I should therefore like to apply for a grant from Swift and Company of $15,000 a year for a period of five years for carrying on this work. This money would be used for the salaries of specially trained scientific workers and technical assistants and for the purchase or construction of necessary apparatus and equipment. The program would comprise x-ray diffraction

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determinations of the structures of naturally occurring amino acids or of their heavy metal salts, which because of the usefulness of the metal atoms as reference points in Fourier projections might yield more readily to x-ray analysis; it would also include determinations of the structures of several simple peptides and other compounds related to proteins. The work would be supervised by Dr. Robert B. Corey, Research Associate in Structural Chemistry at this Institute, and myself. Dr. Corey and his collaborators have done the earlier work on the crystal structure of the amino acids.

If in your judgment Swift and Company would be interested in the program of work which I have outlined, I shall be grateful if you will forward this application to Dr. Newton, or inform me in case a more formal application should be made.

Sincerely yours,

LP:gw

Linus Pauling